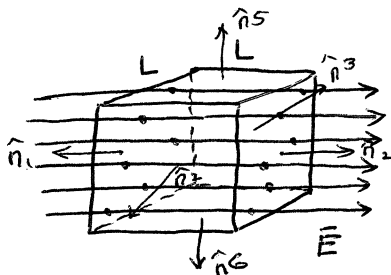


PHY 212 General Physics II - Electricity, Magnetism and Light
Summer 2007

Quiz 2 Tuesday, July 10

Name: WORKED OUT COPY

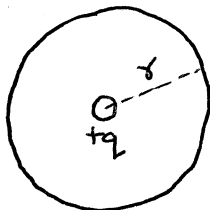
1. (5 points) **Electric flux through a cube** Electric flux Φ is given by $\Phi = \int \mathbf{E} \cdot d\mathbf{A}$. Find the electric flux through the cube given below.



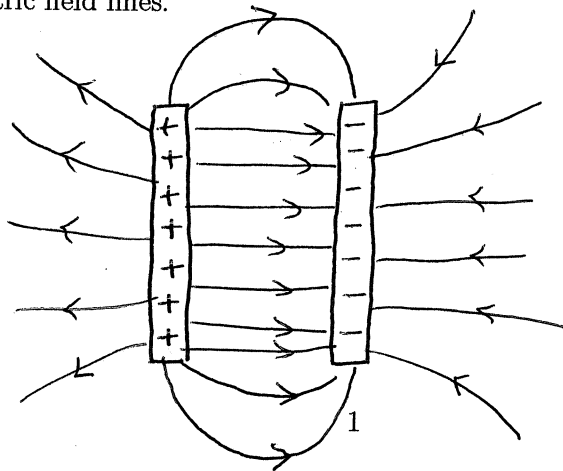
$$\begin{aligned}\Phi &= \Phi_1 + \Phi_2 + \Phi_3 + \Phi_4 + \Phi_5 + \Phi_6 \\ \Phi_1 &= \vec{E} \cdot \hat{n}_1 A = EL^2 \cos 180^\circ = -EL^2 \\ \Phi_2 &= \vec{E} \cdot \hat{n}_2 A = EL^2 \cos 0^\circ = +EL^2 \\ \Phi_3 &= \Phi_4 = \Phi_5 = \Phi_6 = EL^2 \cos 90^\circ = 0 \\ \therefore \Phi &= -EL^2 + EL^2 + 0 + 0 + 0 + 0 = 0\end{aligned}$$

2. (5 points) **Electric flux through a sphere** Electric flux Φ is given by $\Phi = \int \mathbf{E} \cdot d\mathbf{A}$. Find the electric flux through the sphere given below. (It contains a charge $+q$.)

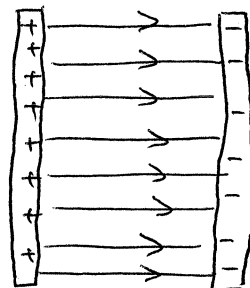
$$\Phi = \int \vec{E} \cdot d\vec{A} = \int E dA = E \int dA = E (4\pi r^2)$$



3. (5 points) Two oppositely charged plates are shown in the picture below. Draw the electric field lines.



"Fringing" not ignored



"Fringing" ignored

(full credit for two pictures)